

Remarks/Arguments:

Applicants thank the Examiner for the courtesies extended to their representative during a telephone interview on November 4, 2009. The Examiner agreed to place Schlereth U.S. Patent No. 6,734,467 on a PTO Form 892 when the next Office Action is issued in order to indicate that Schlereth was considered. Various possible amendments to claim 1 were discussed; but no agreement was reached.

The pending claims are 1-41. Claims 1, 20, 28, 30, 31, 35, and 36 have been amended. Claims 37-41 have been added. No new matter is introduced therein.

In paragraph 2 of the Office Action, claims 1-10, 12-16 and 28-32 have been rejected under 35 U.S.C. § 102(e) as anticipated by Harada (U.S. Patent Application Publication No. 2003/0230751). The rejection is traversed.

Claim 1 has been amended to recite, in part:

. . . an optic device, having at least one transparent side wall, configured to receive the backward transmitted light and transfer the backward transmitted light outside of the optic device through the at least one transparent side wall.

The amendments are supported at least by page 13, lines 13-19 and Figs. 2, 6, and 13.

In Applicants' Fig. 2, for example, reflected light 18, 22 is transmitted outside of the cylindrical optic through the light transmissive properties of the cylindrical optic. (page 11, lines 5-9). In other words, the optic is configured to transfer the backward transmitted light to the outside of the optic device through a transparent side wall of the optic device and not remain in the cylindrical optic. See also, Figs. 6 and 13.

The Office Action does not clearly correlate by reference number any element in Harada to the optic device recited in amended claim 1. Instead, the Office Action states: "(Fig. 2, see reflectors on either side of source)." Applicants assume, therefore, that the Office Action equates Harada's reflectors 4b to the claimed optic device. If Applicants' assumption is incorrect, they respectfully request clarification in the next Office Action. Applicants do not believe that limiter 4a is intended because limiter 4a acts on light from source 2. (see, para. [0044], page 3)

Referring to Harada's Fig. 2, the Office Action contends that Harada discloses an optic device configured to receive backward transmitted light and transfer the backward transmitted light outside of the optic device. Although Applicants respectfully disagree, they have amended claim 1.

In Harada, when light from light-emitting element 2 impinges on phosphor 5, some of the light is reflected back from the phosphor. This reflected light is then, in turn, reflected by reflector 4b. (paras. [0045]-[0047], Fig. 2). That is, Harada's solution to the problem of lost light is for its reflector 4b to receive the backward reflected light and then to convert it into forward (upward) facing light. When reflector 4b converts the backward reflected light into forward (upward) facing light, the light is no longer backward reflected light. It is then forward (upward) facing light.

Accordingly, the operation of Harada is very different from the operation of Applicants' claimed invention and provides a different solution to the problem of lost light than Applicants' solution. As recited in amended claim 1, Applicants' optic device, has "at least one transparent side wall" and is "configured to receive the backward transmitted light and transfer the backward transmitted light outside of the optic device through the at least one transparent side wall." Accordingly, Applicants' amended claim 1 device transmits the backward transmitted light outside of the optic device through at least one transparent side wall of the optic device as backward transmitted light without first converting the backward transmitted light into forward (upward) facing light. Applicants' claimed invention is therefore more efficient than the Harada device.

In Fig. 2 of Harada, backward transmitted light is emitted by wavelength converter 5 into sealing material 8. Reflector 4b stops the backward flow of the backward transmitted light, converts it into forward (upward) facing light, and reflects the forward facing light back toward aperture plate 6. Harada does not allow the transfer of backward transmitted light outside the reflector 4b through a transparent side wall of reflector 8 because reflector 8 does not have a transparent side wall. Instead, Harada transfers forward facing light (derived from, but not the same as, backward transmitted light) outside its reflector 4b by reflection - not by transferring backward transmitted light through at least one transparent wall of reflector 4b. Applicants' amended claim 1 solution to the problem of lost light is therefore completely different from Harada's solution.

Accordingly, amended claim 1 and dependent claims 2-10 and 12-16 are not subject to rejection under 35 U.S.C. § 102(e) as anticipated by Harada for at least the above reasons.

New claim 39, dependent from amended claim 1, recites:

. . . the optic device is configured to transfer at least a portion of the backward transmitted light outside of the optic device through the at least one transparent side wall without the at least a portion of the backward transmitted light being reflected off the at least one transparent side wall.

These recitations are supported at least by page 11, lines 5-9; 18, lines 24-26; Figs. 2, 6 and 13. Claim 39 is not subject to the rejection for at least the same reasons that amended claim 1 is not subject to the rejection. Because these features are also not disclosed or suggested in Harada, claim 39 is not subject to the rejection for at least these additional reasons.

Claim 28 has been amended similarly to amended claim 1. It also recites, in part:

. . . an optic device. . . configured to . . . transfer substantially all of the backward transmitted light outside of the optic device through the at least one transparent side wall.

Dependent claim 29 recites that "at least 84% of the combined transmitted light and backward transmitted light is transferred outside of the optic device." These claims are not subject to rejection for at least the reasons discussed above regarding amended claim 1. In addition, the Office Action's basis for these rejections is solely Fig. 2, without reference to anything in Harada's specification disclosing that "substantially all" or that "approximately 84%" of the backward transmitted light is transferred outside of the optic device. For these additional reasons, therefore, amended claim 28 and claim 29 are not subject to the rejection.

Claim 30 has also been amended in a way that is similar to claim 1's amendment and is therefore not subject to the rejection for at least the reasons discussed above regarding the rejection of amended claim 1. In addition, light in Harada's Fig. 2 is not transferred outside the optic device between light source 2 and phosphor 5. Instead, Harada's light either transmits through phosphor 5 or to the sides of phosphor 5 and to the sides of light source 5. Contrary to the Office Action's assertion, light in the middle of Harada's Fig. 2 transmits through phosphor 5 - not to the side of phosphor 5. See, para. [0044] which states that "almost entire light

radiated from the semiconductor light-emitting element 2 ends up reaching the wavelength converter 5." Harada does not disclose that any remaining light from element 2 reaches the sides of aperture plate 6 and it cannot be assumed that it does.

Claim 31 has been amended to recite that the optic device is configured to "avoid substantially all of the backward transmitted light from undergoing multiple reflections within the optic device." This recitation is supported at least by page 18, lines 23-26 of Applicants' specification. As explained above, the Harada device is expressly designed to undergo multiple reflections within its device. It undergoes at least two reflections: one reflection from wavelength converter 5 toward reflector 4b and another reflection from reflector 4b back up toward wavelength converter 5 and aperture plate 6. In contrast, Applicants' claimed device is configured to avoid multiple reflections. For at least these reasons, therefore, amended claim 31 and dependent claim 32 are not subject to the rejection.

In paragraph 4 of the Office Action, claims 20-25 have been rejected under 35 U.S.C. § 102(b) as anticipated by Iwasa (U.S. Patent Application Publication No. 2002/0047516). Claim 20 has been amended to recite, in part:

. . .a down conversion material, disposed along a central longitudinal axis within the cylindrical optic. . . .

These amendments are supported at least by page 10, lines 10-16; page 11, lines 35-36; Fig. 2. In Iwasa, the LEDs are along the central axis. Amended claim 20 recites that the down conversion material is along a central longitudinal axis. Accordingly, amended claim 20 and dependent claims 21-25 are not anticipated by Iwasa for at least these reasons.

Page 7 of the Office Action (part of paragraph 4 of the Office Action) refers to rejections of dependent claims 35 and 36 even though the beginning of paragraph 4 on page 6 of the Office Action does not refer to claims 35 and 36. Applicants assume that page 6 of the Office Action intended to indicate a rejection of claims 35 and 36 as anticipated by Iwasa. If Applicants are incorrect, they respectfully request clarification of this rejection in the next Office Action.

Because claim 35 depends from amended claim 20, it is not subject to the rejection for at least the same reasons that amended claim 20 is not subject to rejection. In addition, claim 35 has been amended to recite "the down conversion material has at least a first side for

transmitting light and reflecting light." (emphasis added) Claim 36 dependent from claim 35, has been amended to recite "the down conversion material has at least a second side for transmitting light and reflecting light." (emphasis added) Iwasa does not disclose that its double fluorescent body 102 has two sides, each of which are "for transmitting light and reflecting light." Accordingly, amended claims 35 and 36 are not subject to the rejection for at least these additional reasons.

New claims 37, 38, 40, and 41, dependent from amended claim 20, have been added and are not subject to rejection for at least the same reasons that amended claim 20 is not subject to rejection. Claim 37 recites

a first segment of the at least two separate segments of the cylindrical optic has a first surface, a second segment of the at least two separate segments of the cylindrical optic has a second surface, and the down conversion material is disposed between the first surface and the second surface.

Claim 40 recites that "the first surface is a first planar surface and the second surface is a second planar surface." Claim 41 recites that "each segment of the at least two separate segments of the cylindrical optic is comprised of a solid material." These recitations are supported at least by page 10, lines 10-16, 31-32; page 11, lines 34-36; Figs. 2 and 3. Iwasa does not disclose or suggest an optic having at least two separate segments, each segment having a surface, and a down conversion material disposed between the two surfaces of the two segments. Iwasa also does not disclose an optic having two separate segments made of a solid material. For these additional reasons, therefore, claims 37, 40, and 41 are not subject to the rejection.

Dependent claim 38 recites "the cylindrical optic receives the light reflected by the down conversion material and transfers the reflected light outside of the cylindrical optic." These features are supported at least by page 8, lines 30-31; page 10, lines 34-37; page 11, lines 5-9. Claim 38 is not subject to rejection for at least the reasons set forth above regarding amended claim 20.

Paragraph 6 of the Office Action has rejected claim 11 under 35 U.S.C. § 103(a) as unpatentable over Harada. Because claim 11 depends from amended claim 1, claim 11 is not subject to the rejection for at least the same reasons as amended claim 1.

Paragraph 7 of the Office Action has rejected claim 17 under 35 U.S.C. § 103(a) as unpatentable over Harada in view of Broer (U.S. Patent No. 6,210,012). Claim 17 depends from amended claim 1. Because neither Harada, nor Broer, nor a combination of Harada and Broer disclose or suggest all of the features recited in amended claim 1, neither amended claim 1 nor claim 17 are subject to this rejection.

Paragraph 8 of the Office Action has rejected dependent claims 18 and 19 under 35 U.S.C. § 103(a) as unpatentable over Harada in view of Kano (U.S. Patent No. 3,875,456). The rejection of claim 18 is not understood. Although the rejection is purportedly based upon Harada in view of Kano, the last paragraph on page 8 seems to reject these claims over Kano and Singer, with Singer being the primary reference. In addition, paragraph 8's reference to a "reflector (1)" in Harada appears to be incorrect because Harada does not have a reflector 1. Applicants are therefore unable to respond to the rejection of claim 18, and respectfully request that the rejection be clarified in the next Office Action or allow claim 18 and should either be clarified in the next Office Action or the claim should be allowed.

Claim 19 depends from claim 18. The rejection of claim 19 on page 9 of the Office Action appears to rely upon Harada as the primary reference. This rejection is also not understood because it is inconsistent with the rejection of claim 18.

In addition, claim 19, also dependent from amended claim 1, recites that the down conversion material (recited in both claims 1 and 19) has a curved shape. Para. 2 of the Office Action equates the down conversion material recited in amended claim 1 with Harada's wavelength converter 5. But the rejection of claim 19 inconsistently equates Harada's wavelength converter 9 with the recited down conversion material. In addition, page 9 of the Office Action does not explain what, if anything, Kano contributes to this rejection. For all of the above reasons, Applicants are unable to respond to the rejection of claim 19 and request clarification in the next Office Action or its allowance.

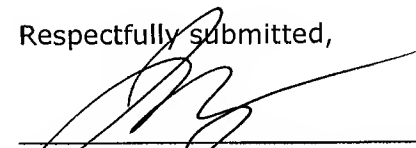
Paragraph 9 of the Office Action has rejected dependent claims 26 and 27 under 35 U.S.C. § 103(a) as unpatentable over Iwasa. Paragraph 10 of the Office Action has rejected claim 34 under 35 U.S.C. § 103(a) as unpatentable over Iwasa in view of Harada. Because these claims depend from amended claim 20, and since the features of amended claim 20 are not contained in Harada, in Iwasa, or in a combination of Harada and Iwasa, these claims are also not subject to rejection.

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For all of the above reasons, Applicants respectfully submit that none of the pending claims are subject to rejection and that all of the pending claims are in condition for allowance, which action is requested expeditiously.

Respectfully submitted,



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